07-24-03

AF 3/
PTO/SB/21 (6-98)

Please type a plus sign (+) inside this box → +

Approved for use through 09/30/2000. OMB 0651-0031
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/333,564
Filing Date	June 21, 1999
First Named Inventor	Nancy F. Dean
Group Art Unit	1771
Examiner Name	C. Juska
Total Number of Pages in This Submission	
Attorney Docket Number	JM34806US

ENCLOSURES (check all that apply)

- [X] Fee Transmittal Form
  - [X] Fee Attached
- [ ] Amendment / Response
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Assignment Papers (for an Application)
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition Routing Slip (PTO/SB/69) and Accompanying Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Small Entity Statement
- [ ] Request for Refund
- [ ] After Allowance Communication to Group
- [ ] Appeal Communication to Board of Appeals and Interferences
- [X] Appeal Communication to Group (*Appeal Notice, Brief, Reply Brief*) in triplicate
- [ ] Proprietary Information
- [ ] Status Letter
- [ ] Additional Enclosure(s) (please *identify below*):

Return Postcards (2)
A check for $320.00

Remarks: Customer No. 021567
The Commissioner is hereby authorized to charge any additional fees required under 37 C.F.R. Section 1.16 and Section 1.17 and credit any overpayments to account no. 23-0925.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	James E. Lake Reg. No. 44,854; Wells St. John P.S.
Signature	James E. Lake
Date	22 Jul 2003

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on this date:

Typed or printed name			
Signature		Date	

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be send to the Chief Information Officer Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

EV085414266

PTO/SB/17 (12/99)
Approved for use through 09/30/2000. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL for FY 2000

Patent fees are subject to annual revision.
Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12. See 37 C.F.R. §§ 1.27 and 1.28.

TOTAL AMOUNT OF PAYMENT ($)320.00

Complete if Known	
Application Number	09/333,564
Filing Date	June 21, 1999
First Named Inventor	Nancy F. Dean
Examiner Name	C. Juska
Group / Art Unit	1771
Attorney Docket No.	JM34806US

RECEIVED
JUL 29 2003
TC 1700

METHOD OF PAYMENT (check one)

1. [X] The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number: 23-0925

Deposit Account Name: Wells St. John P.S.

[X] Charge Any Additional Fee Required Under 37 CFR §§ 1.16 and 1.17

2. [X] **Payment Enclosed:** [X] Check [ ] Money Order [ ] Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	690	201	345	Utility filing fee	0.00
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	690	208	345	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) ($) 0.00

2. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total Claims	0	-20** =	0	X		=	0
Independent Claims	0	- 3** =	0	X		=	0
Multiple Dependent						=	0

***or number previously paid, if greater; For Reissues, see below*

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	78	202	39	Independent claims in excess of 3
104	260	204	130	Multiple dependent claim, if not paid
109	78	209	39	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	0.00
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	0.00
139	130	139	130	Non-English specification	0.00
147	2,520	147	2,520	For filing a request for reexamination	0.00
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	0.00
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	0.00
115	110	215	55	Extension for reply within first month	0.00
116	380	216	190	Extension for reply within second month	0.00
117	870	217	435	Extension for reply within third month	0.00
118	1,360	218	680	Extension for reply within fourth month	0.00
128	1,850	228	925	Extension for reply within fifth month	0.00
119	300	219	150	Notice of Appeal	0.00
120	300	220	150	Filing a brief in support of an appeal	320.00
121	260	221	130	Request for oral hearing	0.00
138	1,510	138	1,510	Petition to institute a public use proceeding	0.00
140	110	240	55	Petition to revive - unavoidable	0.00
141	1,210	241	605	Petition to revive - unintentional	0.00
142	1,210	242	605	Utility issue fee (or reissue)	0.00
143	430	243	215	Design issue fee	0.00
144	580	244	290	Plant issue fee	0.00
122	130	122	130	Petitions to the Commissioner	0.00
123	50	123	50	Petitions related to provisional applications	0.00
126	240	126	240	Submission of Information Disclosure Stmt	0.00
581	40	581	40	Recording each patent assignment per property (times number of properties)	0.00
146	690	246	345	Filing a submission after final rejection (37 CFR § 1.129(a))	0.00
149	690	249	345	For each additional invention to be examined (37 CFR § 1.129(b))	0.00
				Other fee (specify) ______	0.00
				Other fee (specify) ______	0.00

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 320.00

SUBMITTED BY				Complete *(if applicable)*	
Name *(Print/Type)*	James E. Lake	Registration No. *(Attorney/Agent)*	44,854	Telephone	US-509-624-4276
Signature	[signature]			Date	22 Jul 2003

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

EV085414266

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/333,564
Filing Date .... June 21, 1999
Inventor.. Nancy F. Dean, et al
Assignee....................... Honeywell International Inc. / Energy Science Laboratories, Inc.
Group Art Unit.. 1771
Examiner .... C. Juska
Attorney's Docket No. JM34806US
Title: Compliant Fibrous Thermal Interface

BRIEF OF APPELLANTS

To: MS Appeal Brief - Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313

From: James E. Lake (Tel. 509-624-4276; Fax 509-838-3424)
Wells St. John P.S.
601 W. First Avenue, Suite 1300
Spokane, WA 99201-3828

Appellants appeal from the February 26, 2003 Office Action (Paper No. 30) finally rejecting claims 32-57. This brief is submitted in triplicate. A check is included in the amount of $320.00 in payment of the fees required under 37 CFR 1.17(c).

<u>**TABLE OF CONTENTS**</u>

I. REAL PARTIES IN INTEREST.

The real parties in interest of this application are Honeywell International Inc. and Energy Science Laboratories, Inc. as evidenced by the assignment of the pending application to such parties recorded respectively at reel 013542, frame 0789 on December 2, 2002 and at reel 010270, frame 0988 on December 16, 1999 in the Assignment Branch of the Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES.

Appellants, Appellants' undersigned legal representative and the assignee of the pending application are not aware of any appeals or interferences that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS.

Claims 32-55 are pending in the application with claims 1-31 previously canceled from the application and claims 56 and 57 canceled concurrent with the filing of the present Brief. Claims 32-55 stand finally rejected and are being appealed.

IV. STATUS OF AMENDMENTS.

Concurrent with the present Brief, Appellants filed an after-final amendment in a separate paper canceling claims 56 and 57 and amending claims 53 and 55 that depend respectively from claim 35 and 48. Appellants have not as yet received an indication of the status of the after-final amendment.

V. SUMMARY OF THE INVENTION.

A concise explanation of the invention defined in the claims that are the subject of the present appeal follows. The invention pertains to thermally conductive structures, such as thermal interfaces, and to methods of making thermal interfaces. Fig. 2 of the Specification shows a plurality of thermally conductive fibers 32 that are embedded in a support material (not numbered, shown in Figs. 1A and 1B), such as an adhesive or a gel. (Specification, pg. 6, lns. 18-23.) Fig. 2 also shows an encapsulant 30, such as a gel, between portions of fibers 32 that extend upwardly out of the support material. (Specification, pg. 8, lns. 12-24.) Notably, fibers 32 terminate in tips that are elevationally above the outermost surface of encapsulant 30. (Specification, pg. 8, ln. 25 - pg. 9, ln. 17.) In one example, the support material and encapsulant 30 had a combined thickness that encapsulated approximately 85% of the individual lengths of fibers 32. (Id.) The combination of the support material (which may be an encapsulant gel), encapsulant 30, and fibers 32 having the indicated structural relationships thus provides a thermally conductive structure with superior performance as a thermal interface between surfaces. (Specification, pg. 5, lns. 9-32.) Fibers 32 flex in their tip region to maintain an excellent

degree of contact with surfaces, even those surfaces with deviations from surface planarity, minimizing contact resistance and enhancing thermal conductivity between surfaces. (Id.) The thermally conductive structure can be removed from the equipment with which it is manufactured and used in a variety of applications. (Specification, pg. 8, lns. 20-24; Specification, pg. 5, lns. 22-32.)

VI. ISSUES.

1. Are claims 32-50, 53, and 55 unpatentable within the meaning of 35 U.S.C. § 103 over U.S. Patent No. 5,852,548 to Koon (hereinafter Koon '548) taken in view of U.S. Patent No. 5,725,707 to Koon (hereinafter Koon '707)?

2. Are claims 51, 52, and 54 unpatentable within the meaning of 35 U.S.C. § 103 over Koon '548 taken in view of Koon '707 and further taken in view of U.S. Patent No. 6,080,605 to Distefano (hereinafter Distefano) and U.S. Patent No. 6,204,455 to Gilleo (hereinafter Gilleo)?

VII. GROUPING OF CLAIMS.

Independent claims 32 and 46 stand or fall as one group.

Independent claims 35, 37, 42, 45, and 48 and claims 36, 38-41, 43, 44, 51, 52, and 54 depending there from, along with claims 33, 34, and 47 depending from other independent claims stand or fall as one group.

Dependent claim 49 stands or falls as one group.

Dependent claims 50, 53, and 55 stand or fall as one group.

VIII. ARGUMENT.

A. Claims 32-50, 53, and 55 Are Patentable Over The Cited References Within The Meaning Of 35 U.S.C. § 103.

1. Summary of the Office's rejection.

Claim 32 sets forth a thermal interface that includes, among other features, an encapsulant and a plurality of thermally conductive fibers forming a thermally conductive composite. An average length of the fibers is greater than an average thickness of the encapsulant along an average direction of the fiber lengths.

Claim 35 sets forth a thermal interface that includes, among other features, a support material, an encapsulant, and a plurality of thermally conductive fibers forming a thermally conductive composite. A third surface of the composite defines an outermost surface except for fiber tips terminating elevationally above the third surface and the encapsulant.

Claim 37 sets forth a thermally conductive structure that includes, among other features, an adhesive, an encapsulant, and a plurality of thermally conductive fibers. Tips of the fibers extend to above the encapsulant.

Claim 42 sets forth a thermally conductive structure that includes, among other features, an adhesive, an encapsulant, and a plurality of thermally conductive fibers. A third surface of the structure defines an outermost surface except for fiber tips terminating elevationally above the third surface and the encapsulant.

Claim 45 sets forth a thermally conductive structure that includes, among other features, an adhesive, an encapsulant, and a plurality of thermally conductive fibers. The encapsulant is beneath free tips of the fibers.

The remainder of claims 32-50, 53, and 55 depend from one of the above described claims or otherwise set forth analogous limitations. Claims 32-50, 53, and 55 thus set forth structural relationships between fiber tips and the encapsulant and support material.

The Office previously alleged in the July 31, 2001 Office Action that Koon '548 teaches a portion of fiber length embedded in adhesive wherein heat transfer occurs through the exposed portion of the fiber lengths contacting air flow. (Paper No. 14, pg. 5.) Pgs. 5-6 of Paper No. 14 state that Koon '707 is relied upon as suggesting modification of Koon '548 by adding encapsulant. The February 26, 2003 Office Action incorporates such grounds for rejection by reference. (Paper No. 30, pg. 3.) The motivation relied upon by the Office to suggest such modification is the teaching of Koon '707 "to enhance a conductive pathway between a heat-producing material and a heat-dissipating material by providing a higher conductivity than air circulating around flocked fibers" as stated in the October 3, 2002 Office Action (Paper No. 26, page 5) and reiterated on page 5 of Paper No. 30. Even so, the Office previously acknowledged on pgs. 5-6 of Paper No. 26 and reiterated on pg. 4 of Paper No. 30 that neither of the Koon references teach the present limitation of an average fiber length greater than an average encapsulant thickness. Instead, the Office alleges that combination of the references inherently teaches such limitation. (Id.)

2. Brief description of the primary cited references and explanation of their deficiencies in suggesting the claimed inventions.

Appellants note that neither of the Koon references, considered alone nor in combination, provide any information that one of ordinary skill can use to determine a proper thickness for the added encapsulant.

a) Koon '548.

Koon '548 does not disclose or suggest adding encapsulant and cannot be considered to include any discussion of a thickness for encapsulant. Paper No. 30 states on pg. 5 that the Office relies upon Koon '548 as allegedly disclosing the claimed "fiber structure." However, the Office admits that Koon '548 does not disclose an average fiber length greater than an average encapsulant thickness, as set forth in claims 32 and 46. (Paper No. 26, pgs. 5-6; Paper No. 30, pg. 4.)

Appellants also assert that Koon '548 does not disclose a support material, an encapsulant, and fiber tips terminating elevationally above an outermost surface and the encapsulant, as set forth in claims 35, 42, and 48. Appellants further assert that Koon '548 does not disclose an adhesive, an encapsulant, and fiber tips extending to above the encapsulant, as set forth in claim 37. Appellants still further assert that Koon '548 does not disclose an adhesive, fibers, and an encapsulant beneath free tips of the fibers, as set forth in claim 45. Accordingly, it is not clear from the record exactly what relevant "fiber structure" Koon '548 supposedly teaches since it is not the claimed "fiber structure." The Office repeatedly states that the fiber structure of Koon '707 is irrelevant to the present rejection since Koon '707 is not relied upon for any teaching of

fiber structure. (Paper No. 30, pg. 5.) Thus, it is apparent that none of the cited references disclose the relevant fiber structure.

b) Koon '707.

What remains to be shown in the art is disclosure of the claimed structural relationships between fiber tips, the encapsulant, and the support material. Koon '707 merely describes fiber flocking opposing surfaces separately, interdigitating the fibers of a first surface with the fibers of a second surface, and applying a polymer material. Such a teaching does not suggest the encapsulant thickness set forth in claims 32 and 46 or the structural relationships set forth in the other claims. As an example, col. 5, lns. 41-45 of Koon '707 describe a 100 mil gap and 80 mil fibers with a 60 mil overlap. The fibers are 20 mil less than the encapsulant thickness filling the gap. Also, col. 5, lns. 27-32 and 45-50 of Koon '707 state that even a minimum overlap of interdigitated fibers will suffice, further widening the gap. The encapsulant of Koon '707 is thus intentionally thicker than the fiber length.

Koon '707 addresses the problem of thermal conductivity between surfaces with two flocked surfaces and interdigitated fibers within an encapsulant. The claimed inventions accomplish the same or better thermal conductivity since there is no reliance on interdigitation. Interdigitated fibers are not required. Two flocked surfaces are not required. Neither of the Koon references contemplate that a thermal interface without interdigitated fibers flocked on opposing surfaces can be formed and similar advantages still expected. The Office Action alleges that it would be obvious to add the claimed encapsulant thickness and a heat dissipating device to Koon '548. (Paper No. 30, pgs. 3-4.)

c) Koon '548 in view of Koon '707.

Appellants assert that no suggestion or motivation exists to add encapsulant to the device of Koon '548. Regardless of whether such a suggestion exists, clearly no disclosure or suggestion exists of how to add the encapsulant such that the claimed thermal interfaces necessarily result. Koon '707 expressly teaches an average fiber length less than average encapsulant thickness. The Office states that "even upon applying a maximum amount of encapsulant to the flocked composite, the average fiber length would inherently be greater than the encapsulant thickness" due to inherent encapsulant shrinkage and some of the fiber being embedded in the substrate "but not encapsulated by said encapsulant." (Paper No. 30, pg. 4.) The stated "maximum" amount of encapsulant is merely a fabrication by the Office. Neither Koon '548 nor Koon '707 provide any mention of such a "maximum" within the meaning applied by the Office.

Koon '548 does not disclose any maximum encapsulant thickness since it does not disclose any encapsulant. The Office acknowledges that Koon '548 does not teach the claimed fiber structure. In addition, Koon '548 teaches maximizing the fiber surface area subject to heat transfer that occurs through the exposed portion of the fiber lengths contacting air flow (i.e., the area not embedded in the substrate or encapsulated). (Koon '548, col. 4, lns. 28-45.) If exposed fiber length in Koon '548 is to be maximized, then such reference can hardly be considered to disclose a maximum encapsulant thickness. Any encapsulant thickness would diminish the desired heat transfer. In Koon '707, a gap between opposing surfaces might be considered a maximum encapsulant thickness. However, such gap is clearly so much larger than fiber length in Koon '707 that no person of ordinary skill would expect fiber tips to become exposed after shrinkage of the maximum

thickness. In fact, shrinkage in Koon '707 would apparently create a defect in the conductive interface.

Accordingly, it is not seen now combining the references will inherently result in teaching all of the claimed limitations. It appears that only the Appellants' specification discloses such a teaching. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citations omitted) (emphasis in original); MPEP § 2112. Further, "[i]n relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis added); MPEP § 2112.

Koon '548 does not teach the claimed "fiber structure" or any maximum encapsulant thickness and can be said to teach against adding any encapsulant that would restrict fiber surface area exposed to air flow. Koon '707 expressly teaches average fiber length less than average encapsulant thickness. Even though it may be possible for combination of the Koon references somehow to yield the claimed structural relationships between fiber tips, the encapsulant, and the support material, such an allegation of the Office is not sufficient to establish inherency. The Office has not sufficiently supported a determination that the claimed structural relationships necessarily flow from combination of the Koon references. At least for such reason, Koon '548 in view of Koon '707 does not disclose or suggest every element of the individual claims.

Accordingly, Appellants' contribution to the art is a teaching of the claimed structural relationships between fiber tips, the encapsulant, and the support material

such that high thermal conductivity can be obtained without the Koon '707 requirement of flocked, opposing surfaces and interdigitated fibers. Appellants' own specification alone provides a teaching of the claimed relationships and the advantage of such structures.

3. The rejection of claims 32-50, 53, and 55 should be reversed because a prima facie case of obviousness has not been established.

The rejection of claims 32-50, 53, and 55 should be reversed at least for failure to establish each of the three criteria for a prima facie case of obviousness. These reasons are described more fully below. For lack of any one of the three criteria, such claims are allowable over the prior art cited by the Office. In combination, these reasons overwhelmingly support the allowability of claims 32-50, 53, and 55. Accordingly, Appellant respectfully requests reversal of the rejections.

a) A prima facie case of obviousness has not been established.

Initially, the Office bears the burden of factually supporting any conclusion of obviousness. The Appellants need not submit any evidence of non-obviousness until the Office produces a prima facie case that the claims are obvious. Three basic criteria are required to establish a prima facie case. First, the prior art must suggest to those of ordinary skill in the art, "that they should make the claimed composition or device, or carry out the claimed process." In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). Second, the prior art must reveal "that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success." Id. Third, all of the

claimed limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580, 582-3 (CCPA 1974). Appellants assert that the Office has not established a prima facie case because the cited combination fails to satisfy at least the first and third criteria.

b) The prior art does not suggest making the claimed device or carrying out the claimed process.

As to the first criterion, obviousness can be established by a combination of references, but not unless there is some motivation in the art to support the combination. The motivation for forming the combination must be something other than hindsight reconstruction based on using Appellants' invention as a road map for such combination. See, e.g., Interconnect Planning Corp. v. Veil, 227 USPQ 543, 551 (Fed. Cir. 1985); In re Mills, 16 USPQ2d 1430 (Fed. Cir. 1990) (explaining that hindsight reconstruction is an improper basis for rejection of a claim). Also, the mere fact that the prior art can be modified does not make the modification obvious "unless the prior art suggested the desirability of the modification." In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Pg. 5 of Paper No. 21 acknowledges and pgs. 3-4 of Paper No. 30 reiterate that "neither of the Koon references teach the present limitation of an average fiber length greater than an average encapsulant thickness." Thus, the Office modified Koon '548 by adding an encapsulant to the flocked fiber heat transfer structure of Koon '548. The suggestion in the art for the desirability of the modification is the alleged expectation in Koon '707 "of increasing the productivity of said heat transfer structure" by enhancing a conductive pathway between the heat-producing material and an added heat-dissipating

material. (Paper No. 26, page 5.) Since Koon '707 uses an encapsulant in combination with flocked fibers, the Office argues that those of ordinary skill would expect the Koon '707 productivity increase by adding encapsulant to Koon '548.

However, Appellants assert that the first criterion of a prima facie case requires that the prior art suggest making the claimed device. Merely adding encapsulant to Koon '548 does not modify Koon '548 in a manner that produces the claimed device. Some additional teaching or suggestion must exist to add an appropriate amount of encapsulant such that the claimed relationships between fiber tips, encapsulant, and support material are at least suggested. Koon '548 does not provide even a mention of encapsulant and cannot be relied upon for the required teaching or suggestion. Koon '548 expressly describes maximizing the fiber surface area subject to heat transfer that occurs through the exposed portion of the fiber lengths contacting air flow (i.e., the area not embedded in the substrate or encapsulated). (Koon '548, col. 4, lns. 28-45.) Thus, Koon '548 teaches against the use of encapsulant. As acknowledged by the Office, Koon '707 also does not disclose or suggest the claimed relationships.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. MPEP § 2141.02 citing W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). The relied upon suggestion in Koon '707 "of increasing the productivity of said heat transfer structure" is only disclosed in Koon '707 as being achieved by fiber flocking opposing surfaces separately, interdigitating the fibers of a first surface with the fibers of a second surface, and applying a polymer material. If a person of ordinary skill desired to increase the productivity of the Koon '548 heat transfer structure, then the clear suggestion by Koon '707 is to fiber flock a heat-dissipating material,

interdigitate the fibers of the heat-dissipating material with the Koon '548 flocked fibers, and apply a polymer material.

The suggestion alleged by the Office to come from Koon '707 of merely adding encapsulant actually departs from the express teachings of Koon '707. The express text of Koon '707 does not provide any expectation whenever "of increasing the productivity of said heat transfer structure" in Koon '548 by merely adding encapsulant. That is, when Koon '707 is properly considered in its entirety, as is required, the <u>only</u> suggestion that may be attributed to Koon '707 is to fiber flock a heat-dissipating material and to interdigitate its fibers with the Koon '548 fibers. The Office's conclusion that Koon '707 suggests doing much less than it expressly discloses as suitable constitutes improper piecemeal application of the reference. Accordingly, Appellants assert that the only identifiable source for a suggestion of the claimed relationships between fiber tips, encapsulant, and support material is the Appellants' own specification. Thus, the Office's conclusion constitutes improper hindsight reconstruction.

Pg. 5 of Paper No. 26 states that "the length of the flocked fibers of Koon '707 vs. the thickness of the encapsulant is irrelevant to the standing rejection" and pg. 5 of Paper No. 30 reiterates such statement. This confirms the failure of the Office to properly consider Koon '707 in its entirety. As described in col. 5, lns. 27-50 of Koon '707, the encapsulant is intentionally thicker than the fiber length. In the context of Koon '707, it is expressly "the length of the flocked fibers of Koon '707 vs. the thickness of the encapsulant" that provides the relied upon increase in productivity and enables heat transfer from a heat-producing material to a heat-dissipating material through the interdigitated fibers. Absent such supposedly "irrelevant" subject matter, Koon '707 would fail to achieve the relied upon increase in productivity.

Appellants acknowledge that the Office does not wish to rely upon the teachings in Koon '707 of fiber length vs. encapsulant thickness. However, the Office must consider the reference in its entirety, including portions that would lead away from the claimed invention. The Office cannot choose to rely upon the result of Koon '707 (increased productivity) while ignoring the structural features that produce the result.

At least for the reasons described above, the cited combination of references fails to suggest to those of ordinary skill in the art that they should make the claimed device or carry out the claimed method and fails to satisfy the first criterion of a prima facie case. The cited art does not suggest the desirability of a modification that produces the claimed inventions. Considering Koon '548 and Koon '707 in their entirety, as required, clearly leads those of ordinary skill away from the claimed invention. Further, interdigitating flocked fibers of a heat-dissipating material with the Koon '548 flocked fibers and applying a polymer material fully addresses the Office's relied upon motivation "of increasing the productivity" of the Koon '548 heat transfer structure without producing the claimed device.

c) All of the claimed limitations are not taught or suggested by the prior art.

As to the third criterion, all of the claimed limitations must be taught or suggested by the prior art. Appellants acknowledge, but reject, the position on pg. 4 of Paper No. 30 that applying encapsulant to the Koon '548 heat transfer structure produces the claimed device since the encapsulant will inherently shrink upon curing, leaving fiber tips exposed above the encapsulant. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citations omitted) (emphasis in original); MPEP §

2112. "In relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic <u>necessarily</u> flows from the <u>teachings of the applied prior art</u>." <u>Ex parte Levy</u>, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis added); MPEP § 2112.

As established above by the Appellants, the cited references do not disclose or suggest the claimed relationships between fiber tips, encapsulant, and support material. Such a feature does not <u>necessarily</u> result merely by combining encapsulant with the heat transfer structure of Koon '548. It is just as likely that the encapsulant could be applied with enough to thickness that even conventional shrinkage is not enough to expose fiber tips. Perhaps it is possible for a randomly selected thickness to result in exposure of fiber tips upon shrinkage of encapsulant. However, such circumstance is not sufficient to establish inherency. Neither of the cited references provides any suggestion or motivation to expose fiber tips after applying encapsulant. Also, neither of the cited references teaches using a thickness that will inherently expose fiber tips. Accordingly, it is improper to conclude that <u>any</u> encapsulant applied to the heat transfer structure of Koon '548 will <u>always</u> result in exposure of fiber tips upon shrinkage. For at least for such reason, the devices and methods of claims 32-50, 53, and 55 do not inherently result from the teachings of Koon '548 in view of Koon '707.

d) Claims 33-45 and 47-55 are separately patentable.

In comparison to claims 32 and 46 that set forth fibers and encapsulant, claims 33-45 and 46-55 each set forth support material in addition to fibers and encapsulant. Koon

'548 merely describes fibers and support material. Koon '707 merely describes fibers and encapsulant. Neither reference discloses or suggests the novel combination of fibers, encapsulant, and support material, much less the claimed structural relationship between fiber tips and such features. To the extent that the art might be improperly found to disclose or suggest a structural relationship between fibers and support material or between fibers and encapsulant, the art cannot be considered to disclose or suggest the claimed structural relationships between fiber tips, encapsulant, and support material. Claims 33-45 and 47-55 are thus separately patentable.

e) Claim 49 is separately patentable.

Claim 49 depends from claim 33 and sets forth that the encapsulant and support material together encapsulate more of the individual lengths of the plurality of fibers than just one end. To the extent that Koon '548 in view of Koon '707 might be improperly found to disclose or suggest applying the encapsulant of Koon '707 to Koon '548 within the requirement of Koon '548 to maximize exposed fiber surface area, claim 49 distinguishes such a combination of features. That is, claim 49 specifies that more than just one end is encapsulated, in direct contradiction to the Koon '548 requirements. Claim 49 is thus separately patentable.

f) Claims 50, 53, and 55 are separately patentable.

Claims 53 and 55 set forth that average fiber length is greater than average combined thickness of the support material and encapsulant between outermost surfaces of the thermal interface. Claim 50 similarly sets forth that the encapsulant and support material have a combined thickness encapsulating approximately 85% of the individual

lengths of fibers. The Office alleges that average fiber length in Koon '548 in view of Koon '707 is inherently greater than average encapsulant thickness partly due to fiber portions embedded in a substrate but not encapsulated. Claims 50, 53, and 55 distinguish the art combination on this basis by specifying that fiber length is greater even considering the thickness of both the support material (or substrate) <u>and</u> the encapsulant. Claims 50, 53, and 55 are thus separately patentable.

g) For the above-stated reasons, the rejection of 32-50, 53, and 55 should be reversed.

For any of the above-stated reasons (VIII.A.2 and 3), the rejections of claims 32-50, 53, and 55 should be reversed. In combination, the above-stated reasons overwhelmingly support such reversal. Accordingly, Appellant respectfully requests that the Board reverse the Office's rejections of claims 32-50, 53, and 55.

B. Claims 51, 52, and 54 Are Patentable Over The Cited References Within The Meaning Of 35 U.S.C. § 103.

Claims 51, 52, and 54 depend from claim 32 or claim 48 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, such claims set forth that the encapsulant comprises a gel or a polymeric gel. Even if Distefano and Gilleo may be considered to teach, as alleged, that silicone elastomers and silicone gels are equivalent encapsulants, such teaching does not necessarily apply to the inventions of claims 51, 52, and 54. Appellants assert that Distefano and Gilleo do not contain any reference to conductive fibers. Applying an encapsulant material to the structures of Distefano and Gilleo may be an entirely different matter from applying the encapsulant material to conductive fibers. Those of ordinary skill

would not expect silicone gels to work in the conductive fiber context just because they work in the context of Distefano and Gilleo. Appellant respectfully requests that the Board reverse the Office's rejection of claims 51, 52, and 54.

IX. CONCLUSION.

In view of the foregoing, reversal of the final rejections of claims 32-55 is respectfully requested. Allowance of such claims is also requested.

Respectfully submitted,

Dated: 22 Jul 2003 By: James E. Lake
James E. Lake
Reg. No. 44,854

S:\HO57\006\M09.doc

X. APPENDIX.

Claims presented below include the amendments requested in a separate paper filed concurrent with the present Brief.

32. A thermal interface comprising:

an encapsulant and a plurality of thermally conductive fibers forming a thermally conductive composite;

individual fibers having a length and the encapsulant having a thickness encapsulating a portion of the individual lengths of the plurality of fibers; and

an average length of the fibers being greater than an average thickness of the encapsulant along an average direction of the fiber lengths.

33. The interface of claim 32 wherein the thermally conductive composite further includes a support material, the fibers being in the support material and the encapsulant being on the support material.

34. The interface of claim 33 wherein the support material comprises an adhesive.

35. A thermal interface comprising:

a plurality of thermally conductive fibers embedded in a support material, the support material having a first surface and a second opposing surface and the fibers having first portions that extend upwardly out of the second opposing surface of the support material;

an encapsulant between the first portions of the fibers and over the support material, the support material, encapsulant, and fibers forming a thermally conductive composite; and

a third surface defining an outermost surface of the thermally conductive composite except for the fiber first portions terminating in tips that are elevationally above the third surface and the encapsulant.

36. The interface of claim 35 wherein the support material comprises an adhesive.

37. A thermally conductive structure, comprising:

a layer of adhesive having a pair of opposing surfaces, the opposing surfaces being a first opposing surface and a second opposing surface;

a plurality of thermally conductive fibers embedded in the adhesive, the fibers having first portions which extend out of the second opposing surface of the layer of adhesive and upwardly from the second opposing surface, the first portions terminating in tips above the second opposing surface of the layer of adhesive, the tips being at a same height above the second opposing surface as one another; the thermally conductive fibers being selected from the group consisting of carbon fibers, metal fibers, and ceramic fibers; and

an encapsulant between the first portions of the fibers and over the adhesive, the tips of the fibers extending to above the encapsulant.

38. The thermally conductive structure of claim 37 wherein the upwardly extending first portions are parallel to one another and perpendicular to the second opposing surface.

39. The thermally conductive structure of claim 37 wherein the thermally conductive fibers are carbon fibers.

40. The thermally conductive structure of claim 37 wherein the encapsulant is on the second opposing surface of the layer of adhesive.

41. The thermally conductive structure of claim 37 wherein the tips are at a same height above the second opposing surface as one another.

42. A thermally conductive structure, comprising:

a layer of adhesive having a pair of opposing surfaces, the opposing surfaces being a first opposing surface and a second opposing surface, the first and second surfaces being spaced from one another along a direction defined as a vertical direction;

a plurality of flocked, thermally conductive fibers embedded in the adhesive, the fibers having first portions which extend upwardly out of the second opposing surface of the layer of adhesive in substantially vertical orientation;

an encapsulant between the first portions of the fibers and over the adhesive; and

a third surface defining an outermost surface of the thermally conductive structure except for the fiber first portions terminating in tips above the third surface and the encapsulant.

43. The thermally conductive structure of claim 42 wherein the third surface comprises a surface of the encapsulant.

44. The thermally conductive structure of claim 42 wherein the thermally conductive fibers are carbon fibers.

45. A thermally conductive structure, comprising:

a layer of adhesive having a pair of opposing surfaces, the opposing surfaces being a first opposing surface and a second opposing surface, the first and second surfaces being spaced from one another along a direction defined as a vertical direction;

a plurality of flocked, thermally conductive fibers embedded in the adhesive, the fibers having first portions which extend upwardly out of the second opposing surface of the layer of adhesive in substantially vertical orientation, the fiber first portions terminating in tips above the second opposing surface of the layer of adhesive; and

an encapsulant over the adhesive, between the first portions of the fibers, and beneath free tips of the fibers.

46. A method of making a thermal interface comprising:

combining an encapsulant with a plurality of thermally conductive fibers, individual fibers having a length and the encapsulant having a thickness;

encapsulating a portion of the individual lengths of the plurality of fibers, an average length of the fibers being greater than an average thickness of the encapsulant along an average direction of the fiber lengths; and

forming a thermally conductive composite from the encapsulant and the fibers.

47. The method of claim 46 further comprising applying the fibers into a support material and applying the encapsulant on the support material.

48. A method of making a thermal interface comprising:

embedding a plurality of thermally conductive fibers in a support material, the support material having a first surface and a second opposing surface and the fibers having first portions that extend upwardly out of the second opposing surface of the support material;

applying an encapsulant between the first portions of the fibers and over the support material, the support material, encapsulant, and fibers forming a thermally conductive composite;

forming a third surface defining an outermost surface of the thermally conductive composite except for the fiber first portions terminating in tips that are elevationally above the third surface and the encapsulant.

49. The interface of claim 33 wherein the encapsulant and support material together encapsulate more of the individual lengths of the plurality of fibers than just one end.

50. The interface of claim 33 wherein the encapsulant and support material have a combined thickness encapsulating approximately 85% of the individual lengths of the plurality of fibers.

51. The interface of claim 32 wherein the encapsulant comprises a gel.

52. The interface of claim 32 wherein the encapsulant comprises a polymeric gel.

53. The interface of claim 35 wherein the first surface opposes the third surface and defines another outermost surface of the thermally conductive composite, an average length of the fibers being greater than an average thickness from the first surface to the third surface along an average direction of the fiber lengths.

54. The method of claim 48 wherein the encapsulant comprises a gel.

55. The method of claim 48 wherein the first surface opposes the third surface and defines another outermost surface of the thermally conductive composite, an average length of the fibers being greater than an average thickness from the first surface to the third surface along an average direction of the fiber lengths.